

Extraclass Activities

in AVIATION

PHOTOGRAPHY

RADIO

for secondary school pupils

SUGGESTIONS FOR SCHOOL ADMINISTRATORS AND SPONSORS

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Definitions¹

Extraclass activities.—Pupil activities under school sponsorship commonly outside regularly scheduled classes, for which no graduation credit is usually given and for which no course of study ordinarily exists. In this publication, *cocurriculum*, *pupil activities*, and *activity program* are synonymous with *extraclass activities*.

Activity period.—A period during the regular school day set aside for pupil participation in all-school and extraclass activities, including some or all of the following: club program, homeroom meetings and group discussions, assemblies, and stated meetings of school service groups (Student Council, Honor Society, Gym Leaders, etc.).

Club program.—Voluntarily organized pupil activities provided by the school, including hobby, departmental, social, dramatic, oratorical, journalism, musical, fine arts, and personal development club groups.

¹ From *The Activity Period in Public High Schools*, by Ellsworth Tompkins. Washington: U. S. Government Printing Office, 1951. (U. S. Office of Education Bulletin 1951, No. 19.)

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Foreword

THIS BULLETIN deals with three selected extraclass activities important to the Nation's scientific and technological progress and with their place in the modern secondary school. It reviews and highlights good practices in these three fields so that schools now having programs may be able to improve them and those having none may be stimulated to start them.

A great many secondary schools are today carrying on club activities of the kind described in this bulletin, but many more could well consider doing so as a means to help identify pupils having special interests and aptitudes. Further, these schools might well discover that the same activities could motivate formal classroom interest and achievement in science, mathematics, and industrial arts.

The Office of Education is grateful to, and thanks, the many school officials and other persons, and the many organizations, that gave generously of their time and supplied information and photographs.

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Introduction

ONE OF THE OUTSTANDING CHARACTERISTICS of American secondary education is the emphasis that it places upon individual and social needs. Most educators endorse student extraclass activities as an important way to obtain program flexibility, meet individual needs, and attain desirable education objectives.

Among the purposes of this publication are the following:

- To bring together information to point up promising practices.
- To furnish school administrators with information to use as a guide in developing better local practices.
- To suggest ways of organizing and administering certain activities.
- To show benefits to pupil, school, and community from certain student activities.
- To highlight such values as early identification of pupils having special skills and interests, development of skills and understandings usable in later life, retention in school of pupils who otherwise might drop out, and development of a motivation for classwork.

In these times when we are trying to solve problems relating to the shortage of scientific, technological, and engineering personnel, early identification of youths having special aptitudes and talents by means of club activities is important.

This report will not concern itself with extraclass activities in general. Rather, it will be limited to selected programs in aviation, photography, and radio—fields that are and will be important to our national interests for years to come. Indeed, two subcategories—aircraft and engine mechanics and electronic technicians—appear on the Bureau of Labor Statistics' 1955 list of occupations having currently critical personnel shortages.

Most schools have adopted activity programs such as chorus, dramatics, homeroom activities, etc. However, those especially tailored to meet the specific needs of youths having a potential future in science or engineering are not so widespread. A doctoral dissertation¹ listed aviation, radio, and photography (in this order) as the most frequently offered scientific-type clubs in 105 sampled New Jersey high schools.

¹ Hobbs, Frank Kraus. *Basic Philosophies of New Jersey School Administrators Toward Hobbies and Their Application in Public Instruction*. New Brunswick, N. J.: Rutgers University, 1941.

The Twentieth Century Fund 1955 study,² reports:

Mass-produced technical and mechanical equipment has opened new opportunities to millions of hobby enthusiasts, such as amateur photographers and radio amateurs, model builders, home carpenters, young "scientists" who experiment in chemistry, electricity and other fields of science.

Whenever a school staff undertakes to study and develop its curriculum, it should seriously consider the value of well organized club programs. School systems adopting the type of activities described in this publication have found that pupils, school, and community all benefit from the experience.

The following methods were used to prepare this publication: review of pertinent literature; correspondence with selected schools (the selection being based on reported successes with certain extraclass activities); school visitation and observation within a limited area; and interviews with leaders and other experienced persons in the three fields. Selective sampling of course cannot reveal all outstanding practices.

²Dewhurst, J. Frederic, and Associates. *America's Needs and Resources*. New York: The Twentieth Century Fund, 1955. p. 358.

Chapter I. Some School Implications of Technological Change

A CENTURY OF TECHNOLOGICAL ADVANCEMENTS throughout the United States, 1850-1950, can be seen in broad perspective from significant data presented in a recent study of the Twentieth Century Fund.¹

Back in 1850, men and animals, it is estimated, supplied 94 percent of the energy for our work and machines only 6 percent. By 1960, machine power, according to estimates, will supply 96 percent and each worker will have increased his productivity 6 times per man-hour of work. Future progress lies in raising our output per man-hour through even greater applications of machine power.

During the last 100 years, our Nation has changed from a predominantly agricultural economy to one basically industrial. In 1820, more than half our workers were in farming and forestry while the remainder were in factory, store, and white-collar jobs. By 1940, the effects of industrial developments had altered the percentages to one-fifth and four-fifths respectively.

Along with increased productive capacity has come a tremendously increased demand for skilled personnel in trades, technology, engineering and science.

Colleges and engineering schools constantly ask secondary schools to give them more and better prepared students. One way to accomplish this is for the secondary schools to make sure that they identify pupils having special skills and interests very early and then give them special help.

How can this be done? Should pupils having special skills be identified simply by listing the ones who receive highest marks in biology, chemistry, physics, or math? Should the school rely wholly on testing or should it use all means at hand for identifying these pupils and helping them develop their skills?

The question may be raised as to whether a pupil's special interests should not be ascertained before he enters the senior high school. In elementary school, many children show marked interest in their extra-class projects. Certainly, in junior high school, both in-class and out-of-class activities are important leads to special skills. Through school

¹ Dewhurst, Fredgie J., and Associates, *America's Needs and Resources*. New York: Twentieth Century Fund, 1955.

club and hobby activities, at whatever grade level, young people often show their first real interests.

Much has been written describing in detail most phases of extraclass activities. For example, McKown,² in 1927, listed the values of clubs and commented on their proper organization. His 1952 revision lists objectives and principles of organization and administration of clubs. Far less has been written, however, to justify the kind of activities which the present bulletin will describe.

In view of the world situation today, aviation, photography, and radio club activities are important to the school program. School administrators, supervisors, curriculum workers, and teachers increasingly realize the implications of technological change. Since this report is limited to activities in aviation, photography, and radio only, it will from this point on become specific.

School administrators recognize what motivation does for individuals. When pupils develop a hobby or other activity that motivates their learning, they are likely to find interest in the formal school subjects. The shy introvert who blossoms out by means of extraclass activities is not a rare case. He is found in all schools. He becomes confident and enthusiastic. He achieves recognition. He often carries his new interest into his classroom work.

The school as well as the pupil gains from club activities. Not the least of the benefits is an enriched curriculum—if the school will plan and administer its activities to that end. For example, according to reports, the following benefits have been realized in high schools which sponsor club activities in aviation, photography, or radio:

1. Opportunities for pupils to apply, in a practical way, the concepts developed in regular classes.
2. Opportunities in formal classes to use, as enrichment, club members' individual projects, activities, experiences or reports.
3. Additional time and the incentive to extend formal course offerings.
4. More opportunities to meet individual pupil needs than are possible in regular classes.
5. More opportunities for pupils to plan and direct activities than possible in regular class.

The White House Conference on Education³ discussed six of the primary educational problems confronting the Nation. Topic 1, "What Should Our Schools Accomplish?", listed 14 items of importance on which conferees agreed. Item 12 was "Wise use of time, including constructive leisure pursuits."

Aviation, photography, and radio club activities are effective ways for pupils to use their leisure time wisely.

² McKown, Harry C. *Extracurricular Activities*. Chicago: The Macmillan Co.

³ Held in Washington, D. C., Nov. 28-Dec. 1, 1955.

The conference report concluded: "Consideration must be given to the need for continuing growth and development in education at all levels in amount and scope, to keep up with the economic, social, and moral implications resulting from the advances in technology and science."

Whether activities are extra- or co-curricular, pupil interests need to be identified by some form of activity-interest query. On the questionnaire, the pupil has an opportunity to list his first, second, and third extraclass interests.

Frequently pupil interest results in a club activity which grows to such proportions that the next year an elective course is offered to meet pupils' specific needs and interests.

A good club activity, however, is not a substitute for a good course. Where sufficient demand exists, as demonstrated by a club, an elective course is the next step. Even then, a club is still needed for pupils who wish to delve deeper into some specialized area. If for any reason the course cannot be offered, a club helps meet expressed needs.

Currently, one of the major problems of many schools seems to be relatively easy of solution. It is a problem in communications. Unfortunately, good practices in aviation, photography, and radio clubs, although successfully worked out, are not reported to other schools. This bulletin will describe a number of good practices holding possibilities for modification or adoption by interested schools. Some of these practices, of course, are not new. Nevertheless, since they have proved successful, they are as potentially valuable as any innovation would be to a school needing them.

The following are a combination of the objectives described by school principals and club sponsors to the author and of those listed in various publications.

1. To offer opportunity for talented pupils to pursue their individual interests.
2. To help identify, as early as possible, pupils having special interests and abilities and to provide them with a program that could lead to later work in science, mechanics, or technology.
3. To develop technical skills and understandings usable in later life.
4. To retain in school some pupils who otherwise might drop out.
5. To develop understandings and appreciations of modern scientific and technological developments.
6. To provide opportunities to develop enduring avocational and leisure time interests and activities.

Chapter II. Aviation as an Extraclass Activity

IN TODAY'S WORLD we see evidence of great progress in man's conquest of the air. Aviation as an industry has grown up in the remarkably short span of just over 50 years. Rapid travel to all parts of the world has become commonplace.

"The United States aircraft industry, in 1954, was the largest manufacturing employer of all industries in the Nation."¹ Employing a multitude of tradesmen, technicians, and engineers in communities across our Nation, aviation is a key industry. It therefore seems important to make available to the student body of our schools, by means of extraclass activities, the opportunity to explore some phases of this growing industry.

In some States,² secondary school aviation hobby clubs are the most frequently offered extraclass activity having scientific implications. Many successful aeronautical engineers testify that aviation club activities contributed to later success in their work. Others have found this activity a challenge to inventiveness or have enjoyed it as a leisure time activity.

From a college of aeronautical technology comes the following information:³ Nearly 50 percent of the freshmen registering for their first semester indicated that they had developed an initial and lasting interest in aviation through model building.

Aviation clubs are obviously an effective and early means to identify and meet the avocational needs of pupils having special skills and interests. These clubs may in fact later lead them to jobs in science or technology.

Extraclass activities in aviation are especially valuable in a program where no aviation course is offered. As in many other similar activities members of aviation clubs find in these clubs an opportunity to pursue some special aviation interest with the zeal of an experimenter.

RELATIONSHIP OF SUBJECT COURSES TO CLUB ACTIVITIES

To place the subject of club activities in context, it is well to see how they are related to the courses offered in the same field. Aviation is not only an extraclass offering but, according to *Offerings and Enroll-*

¹ *Aircraft Facts and Figures*. Aircraft Industries Association, 610 Shoreham Bldg., Washington 5, D. C.

² For example, in New Jersey. See Frank Kramer Hohnly's *Basic Philosophies of New Jersey School Administrators Toward Hobbies and Their Application in Public Instruction*. New Brunswick, N. J.: Rutgers University.

ments in High School Subjects,³ aviation content appeared in five general education courses and one vocational education area. Course titles and the number of States reporting them are as follows:

Science of Aeronautics: 46 States and District of Columbia

Industrial Arts Aviation: 9 States

Air Transportation: 2 States

Meteorology: 9 States

Navigation: 8 States

Aircraft and Engine Mechanics (Vocational): 24 States

As the total enrollment of all these aviation subject courses was only 23,899, it is evident that they benefited relatively few of the 6,907,833 pupils enrolled in public secondary schools for the school year 1948-49. Aviation courses or units in the 5 general education subjects and the 1 vocational field are offered to meet the needs presented by technological change referred to previously. They are designed to contribute to the attainment of important goals in aviation.

Aviation content is not necessarily limited to elective courses or club activities only. The great body of aviation facts and ideas needed by all future citizens in order to understand how aviation affects the world around them can be made to reach most pupils by integrating or infusing appropriate aviation concepts in most grades.

TYPES OF EXTRACLASS ACTIVITIES IN AVIATION

This chapter is confined to the following types of extraclass activities:

1. The Aeronauts or Aeronautic Club
2. The Model Airplane Club
3. The Industrial Arts Aviation Club
4. The School Model Airplane Contest
5. Air Youth Day

The following aims and purposes were cited by sponsors:

1. To foster interest in and knowledge of present-day aviation.
2. To provide an avocational pursuit that will develop skills and understandings usable in future years.
3. To develop good sportsmanship.
4. To cultivate qualities of leadership.

1. The Aeronauts Club

Typical clubs were reported by a high school in Lansdowne, Pa.; also by PS 198 in New York City. In this particular kind of club the faculty

³ *Biennial Survey of Education in the United States, 1948-50*. Ch. 5. Washington: U. S. Government Printing Office, 1951. 118 p. (Federal Security Agency, Office of Education).

sponsor may be called the "moderator" and student officers elected to assist in the club's operation. Some schools prefer to use a student moderator.

The moderator conducts discussions on topics chosen by the group. A "qualified" moderator can carry a topic of interest from discussion to instruction as necessary. Panel discussions are popular and stimulating.

Research topics are assigned and reported on before the club by members. Practice is given in conducting brief business meetings and reading correspondence.

Guest speakers and field trips can be scheduled easily with this type of classroom activity. Members can write letters requesting resource materials from industry and elsewhere. Exhibitions of members' work may be arranged periodically.

Model building and flying is usually conducted as an extracurricular activity for pupils interested in skillful construction and flight testing. The construction for such a project may be done in classrooms, in industrial arts classes, or at home. An innovation by one club was making model planes on production line methods for exhibition or flight.

The classroom type of club is usually most successful when composed principally of boys and girls who want to "ask questions" and develop ideas regarding aviation. Some members may show manipulative skills but these skills are not essential to the successful conduct of this type of club.

Essentials for success appear to be a moderator or sponsor who has had recent experience in some specialized aviation activity and who has a broad understanding of current developments in aviation. It is important that he keep pupil participation at a high level.

2. *The Model Airplane Club*

This type of club usually adopts a colorful name, such as "Winged Trojans," "Wing Dingers," or "Balsa Butchers" and place a major emphasis on manipulative skills. The inschool portion of this activity is usually devoted to planning and discussing technical aspects of model plane building and flying.

How Model Airplane Clubs may be Organized.—Since most of the details of club organization and programing are contained in a free publication entitled "*Model Airplane Club and Chapter Manual*"¹ they need not be repeated here. However, there are some factors that need emphasis, according to reports received.

The sponsor needs to be a skilled model plane designer, builder, or flyer. He should be an enthusiastic hobbyist, whom the club members will recognize as an authority on model building and flying.

¹ Academy of Model Aeronautics, 1025 Connecticut Ave. N.W., Washington 6, D. C.

The *officers* are those normal to similar clubs. As the most skilled and best informed boy is usually elected president, the sponsor would be well advised to invest some time developing his leadership. Showing him how to conduct group planning sessions to develop a program and how to lead a meeting are ways of doing this.

The *facilities* should be suitable for the type of program planned. The industrial arts shop is the most popular place to meet because tools and benches are available. Clubs that plan to do all construction at home can meet successfully in any classroom.

Dues should be kept low. Each member should be required to pay for his own kit or supplies.

Programs are the result of group planning.

This model plane activity is concerned mostly with scientific and technical matters. As part of their program, members like to bring in their model gas engines, run tests, compare performance characteristics, and discuss the pros and cons of wing design. Such activities, if unobtrusively guided by the sponsor, are examples of informal learning at its best.



Courtesy, Kenndec (B. Dak.) High School

Members of a model airplane club show various types of planes they have built.

Experts in various fields, recognized by the club as such, may be scheduled as speakers. Discussions of future careers in science and technological fields are appropriate and valuable. Every opportunity should be used to encourage individuals to design and compute wing areas, wing loadings, and power ratios, using their mathematics, algebra, geometry,

and physics. Many members of such groups often find for the first time a practical use for and an interest in science and math.

Most clubs reported that any large construction work is best done at home because few schools have adequate space to safeguard the delicate model plane in process of assembly. Some clubs encourage each boy to build a model plane box in which to transport his planes and tools. These are often marvels of ingenuity. One sponsor gives an airline sticker to put on the model box of each pupil whenever he attends the after-school club, thereby encouraging attendance.

Test flying is an integral part of the program. Achievement ratings have been found stimulating and helpful in many of the larger clubs. Each school usually sets up its own rating requirements. Some print achievement rating certificates to be presented to pupils as they meet progressively more difficult standards.

The supervisor of industrial arts in one State reported over 60 school model airplane clubs in 1955, with an average enrollment of 19. Some of the most successful clubs enroll 40 to 50 members.

One city in another State reported model airplane clubs in over 30 junior and senior high schools. The supervisory staff of this city has been developing successful patterns of administering aviation club activities for more than 10 years.

In a third State, one model plane club with 12 members was small apparently because the club activity was offered in addition to an elective "ground school course." After completing this course and when they are old enough, pupils become eligible to elect a flight course in a school conducted by the polytechnic high school. Currently this school has 135 students receiving ground and flight instruction. Their ground school has a registration of 185. The flight program has operated for about 10 years with no injury to students and with but 1 accident. (This occurred when an aircraft taxied over a runway light. The cost of repairs was only \$11.57.)

Many communities possess untapped resources such as qualified persons with an interest and willingness to advise and help schools organize aviation club programs. Information regarding leaders and licensed contest directors in any State or community may be obtained by writing to the Academy of Model Aeronautics, 1025 Connecticut Ave. NW., Washington 6, D. C., which is the national organization recognized as headquarters for all aero-modeling activities. A nonprofit organization, it has publications of interest to all clubs. The Academy sets standards for all model plane contests and is the only organization that can certify to national records made under standard conditions.

Good sources of information about how to organize a model airplane club are contained in periodicals and other publications. The aviation

bibliography at the back of this bulletin suggests publications and lists specific references to model airplane club activities.

3. *The Industrial Arts Aviation Club*

As the name implies, this type of club is conducted by the industrial arts department as a part of the school shop program. This club may consider such phases of aviation as transportation, meteorology, navigation, gliding, model-plane building, or aircraft mechanics.

As a club it offers an opportunity for many pupils to explore aviation activities. The faculty sponsor should preferably have had some practical aviation experience.

With shop facilities available, some construction is appropriate. Model building and contest flying are two suggestions. Some schools have combined general aeronautics courses with club activities by offering glider construction and gliding training. The training is an extra-curricular activity usually dependent on available local facilities and on qualified glider construction and flight training personnel in the community. Some high school youth have proved as skilled as adults in the sport of gliding and soaring,¹ which may lead to a future in aviation.

Any group interested in gliding or soaring as a school activity can obtain additional information from the Soaring Society of America, Box 71, Elmira, N. Y., the recognized national organization in this field.

A club activity built around the theme of transportation sometimes studies all means of transportation. Other times, because of local aviation business or industry, the group decides to study air transportation only. Clubs often find local airlines and manufacturing concerns cooperative in sponsoring certain units of a club program. The public relations division of airlines and manufacturers not infrequently awards prizes of scholarships, trophies, or plane rides.

Meteorology and navigation may be emphasized separately or may be combined with weather as a vital interest in many communities. A qualified sponsor who has a proper background may be difficult to find, however. Former military personnel have usually had training in these three subjects. They make good sponsors for such a club.

Exhibitions of student work including especially skillful model building and aircraft mechanic projects, are of great interest to students, parents, and community.

The program of a successful industrial arts aviation club is one that is planned by members, guided by the sponsor, and designed to meet the interests and needs of a majority of the club members.

¹ *American Magazine*, May 1965, p. 57.

4. *The School Model Airplane Contest*

As extraclass activities, local contests to enable club members to test the efficiency of their model planes will help stimulate interest and develop skill.

The same type of activities may be conducted between schools, cities, or States. In any case, the school sponsors and club members should initiate the activity. Sometimes school clubs can obtain financial and publicity support of their activities from local civic organizations, newspapers, department stores, and others.

By participating in such competitive events, school sponsors and pupils often learn organizational and public relations techniques which are useful in developing improved local school extraclass programs.

When more than one school participates in a contest, flights should be made under standard conditions in order that they may be comparable. Nationally accepted regulations provide the standards. They are found in a bulletin entitled *Model Aircraft Regulations*, issued by the Academy of Model Aeronautics, 1025 Connecticut Ave. NW., Washington 6, D. C.



Courtesy, Air Trails (magazine), New York City

Area competition sponsored by community organizations develops skills in 14-year-old boy.

Small local school club contests need not follow these rules but the more capable boys should be directed toward building models that could qualify in national competition.

Many schools arrange interschool model plane competitions the same way as they do interschool basketball. They work out a schedule, get and train contest officials and timers, and select a suitable space for flying events and spectators.

A congested area or an area close to a residential community is not suitable for contest flying. The noise factor alone makes the outskirts of the community a more suitable site.

Service clubs, as sponsors, have been successful in locating unused municipally owned land which can be prepared for a flying field. One local model flying club obtained the cooperation of a local civic club and the town officials, who located some unused level city land down by the railroad tracks. The surface was bulldozed and a control line circle of black top, 80 feet in radius, was laid and rolled. In the center was placed a 5-foot radius cement circle for the contestant. This made a perfect site for control line flying. Additional space was available for other events and for spectators. Altogether, this solution of the problem was one that proved ideal for the particular community and could serve as an example to other communities with similar problems.

School contests are not an end in themselves. It should be evident that they hold values for the individual, the school, and the community.

Model airplane contests develop the individual's understandings of the principles of aerodynamics and the skills he needs to adjust planes to record-breaking performance. They also help develop qualities of perseverance, alertness, and good sportsmanship. For the school, they provide an excellent public relations medium. As in athletic contests, the contestants are on public view. Skill of design and flying are very obvious and parents and newspapers appreciate a school that is able to develop outstanding student performance.

Benefits to the community are worthy use of leisure time by adolescents and an increase in the reservoir of skilled technicians.

The school should use newspaper, radio, and TV to tell how it is helping meet individual needs through clubs that aid pupils having special skills and understandings in science and technological fields. Sometimes a school can find a sponsor who will provide scholarships for top achievement.

Successful Techniques.—One of many good plans for organizing and operating a model airplane contests is the Annual Statewide School Model Airplane Meet plan, now followed successfully by several school aviation clubs. It was originally worked out years ago in Syracuse, N. Y., by the New York State Education Department and the New York State Exchange Club Aviation Commission, aided by the Central

New York Industrial Arts Teachers Club. The operational plan included the following:

1. A printed flyer announced time, place, events, qualifications, and rules and listed the prizes. An attached entry blank called for parent's signature as a liability release.
2. A mimeo announcement sheet to superintendents and principals of schools, giving contest facts, was sent out by the State supervisor of industrial arts.
3. A prepared release was sent to newspapers 10 days in advance of contest.
4. "Contest Procedures for Contestants and Officials" (mimeo) contained flying instructions and a map showing how to reach the flying site.
5. Contestants' large numbered identification tags were provided.
6. Officials' identification tags (different color) were also provided.
7. A contest officials' list explained their duties. Among these officials were registrar, recorder, chief timer, gas event supervisors, rubber-powered and glider event supervisors, and timers. (The number of timers depends on total registration but should be in the ratio of 1 timer for 8 contestants.)
8. Official registration and record sheet. This was a long horizontal sheet ruled for registration data and results of all official flights. All data about each boy were entered on one line—from his contestant number at the left to his best flights at the right.
9. Official timers' cards—a different color for each event—were provided. The timer, who used a verified stopwatch, entered the duration of each contestant's three flights. He recorded the best flight duration in a special box.

The New York statewide contest one year had 175 contestants from 60 school clubs. Their age ranged from 12 to 18 years. The 14-year-olds were the most numerous. Grade 10 had the greatest number of entries—20 percent of the total. The other grades, 7 through 12, had entries ranging from 12 to 17 percent of the total.

New York and other States have found that newspapers are interested in the winners' individual achievements, often carrying 3- or 4-column-wide pictures as well as several columns of copy which credits the school with having identified and developed unusual talents.

5. Air Youth Day

This term was coined in 1953 by the aviation instructor of Garfield High School, Los Angeles, Calif., to designate a statewide occasion to honor schools and youth outstanding in aviation achievements.

The California Aviation Education Association, composed of members representing education, aviation, and military organizations, has sponsored Air Youth Day and other projects. Members of this association obtained the prizes and awards, including trips and scholarships.

One student in each participating school club, selected by his faculty as the most outstanding, receives the "Air Youth" sterling silver wings. Each school having an aviation program receives an "Honor Scroll" attesting to its accomplishments.

An impressive dinner for representatives of schools, award winners, and distinguished guests is held in the Institute of Aeronautical Sciences clubroom with appropriate speeches and presentation of awards.



Courtesy, California Aviation Education Association

Air Youth Day award winners.

School aviation clubs in California have had an important part in developing Air Youth Day. They are not concerned with aviation alone but, as a club, they participate in such student activities as games, sports nights, and social activities. The announcement of faculty selections for aviation honors is an occasion for an enthusiastic assembly program.

Here, again, is an excellent opportunity for good school-community public relations. Stories and pictures of youth and their achievements are outcomes of this program.

COOPERATING AGENCIES

According to high school principals and club sponsors, there are organizations on local, State, and National levels that are glad to assist school club activities. Among them are the following:

Locally, assistance may be available from airlines, aircraft and parts manufacturers, aero clubs, and service clubs such as Exchange, Rotary, Lions, and YMCA. Often they have personnel who will volunteer as contest timers and they may offer prizes for an Air Youth Day or may support all aviation activities in a school.

The assistance of State organizations may be sought. Some States have a director of aeronautics who is a State official in the capitol. Usually his staff is small in number but they will give time to help school aviation projects. They know people in the "aviation world" and can often suggest or obtain speakers. They also know where to get movies, publications, and other school aviation aids.

Nationally, there are a number of aviation organizations with much to offer to school aviation activities. School people furnishing source material for this bulletin named the following.

The Academy of Model Aeronautics, 1025 Connecticut Ave. NW., Washington 6, D. C., is a nonprofit organization of, by, and for the model airplane builder. It is a division of the National Aeronautic Association. As such, it carries the franchise of the Federation Aeronautique Internationale, which appoints one organization in each nation to establish and maintain standard conditions under which all record trials shall be conducted and to certify to the FAI all national records. AMA issues a monthly publication, *Model Aviation*, and has manuals and information available on request regarding leaders and contest directors in all States.

Airline headquarters in general offer a variety of helps for class or club. An educational specialist in the national office of each of three lines will give consultative services and in addition the lines will supply many materials and services. These lines are United Air Lines, School and College Service, 35 East Monroe Street, Chicago 3, Ill.; Trans World Airline, Air World Education, 380 Madison Avenue, New York 17, N. Y.; Pan American World Airways, World Airways Teacher, 23-19 Bridge Plaza North, Long Island City 1, N. Y. The last one sponsors the PAA Load event in model plane contests and provides accompanying trophies.

Boy Scouts of America, 2 Park Avenue, New York 16, N. Y., and Girl Scouts of the U. S. A., 155 East 44th Street, New York 17, N. Y., have their Air Explorer and Air Scouts programs. Literature and information are available on request.

Civil Aeronautics Administration, Washington 25, D. C., has resources in such fields as the operation of civil airways and airports, aviation safety, flight and ground school training, and industrial aviation. A free catalog entitled "*List of General Publications*" is available as well as information regarding the "Air Incentive Movement."

Civil Air Patrol, Aviation Education Section, Bolling Air Force Base, Washington 25, D. C., is usually in the newspaper headlines because of the search and rescue mission of its senior members. It has a junior organization too, called CAP cadets, conducted in some schools as an extracurricular activity. There is a senior CAP "wing" in each State. State or National headquarters will supply, upon request, instructional materials and information about the cadet program.

Department of Health, Education, and Welfare, Office of Education, Washington 25, D. C., has consultative services as well as resource materials of interest to clubs, sponsors, and teachers colleges.

Institute of Aeronautical Sciences, Inc., 2 East 64th Street, New York 21, N. Y., is a technical organization which has a library and local chapter

interests. The local chapters are a source of advice, speakers, and sponsorship.

National Aeronautic Association, 1025 Connecticut Avenue, Washington 6, D. C., has educational interests represented by the AMA and NAEC. Their chapters in many communities are a source of advice, speakers, and sponsorship.

National Aviation Education Council, 1025 Connecticut Avenue, NW., Washington 6, D. C., an educational nonprofit organization affiliated with NAA, is the only national organization concerned solely with aviation education. It has resource materials on aviation of interest to both club and classroom situations. It is primarily a membership organization with a packet service to members and a curriculum service to schools and libraries, and it is a general source of advice, material, speakers, and assistance. The Council's most recent publication is a 14-page booklet, *Aviation Education in the Schools*, prepared by the Aviation Education Committee of the American Association of School Administrators. The booklet is available upon request from NAEC headquarters.

Chapter III. Photography as an Extraclass Activity

PHOTOGRAPHY, a powerful force in modern life, brings concepts and ideas to people through various visual mediums. The power of the printed word is enhanced by photography in such everyday mediums as books, magazines, newspapers, movies, exhibits, and the several processes of advertising that use photographic techniques.

The graphic arts industry is built largely around the photographic processes. From simple photostat to multicolored illustrations for magazines produced by huge lithography presses, photography is an integral part of the process and of the industry.

Photography plays an important part in fields as widespread as fine arts, merchandising, journalism, and advertising. All are large users of photography. These occupations provide thousands of jobs in such fields as press, commercial, portrait, and aerial photography. Photo finishing, photo equipment, supply, and other photo sales fields constantly need better technicians. They are needed also in the newer field of television, where director and cameraman combine to produce the artistry of the better TV programs.

Photography is important not only as a vocation but also as a hobby.

There are 34 million cameras in the hands of nonprofessional photographers. * * * The more ambitious amateurs, 150,000 of them, belong to the 6,000 neighborhood camera clubs and regard their photography as an art. New techniques and equipment have greatly heightened interest in this popular hobby in recent years.¹

The number of amateur photographers has doubled since the end of World War II.²

Because the school program should interpret contemporary life to pupils, photography, representing an important segment of industry, should make an appropriate impact on it. Camera clubs were one of the earliest to find acceptance in schools as an extracurricular activity. They were the forerunner of much broader programs, which today include photography courses and units, photo-service activities, and photography clubs.

¹ Dewhurst, J. Frederic, and Associates. *America's Needs and Resources*. New York: The Twentieth Century Fund, 1955. p. 358.

² *Ibid.*, p. 359.

RELATIONSHIP OF SUBJECT COURSES TO CLUB ACTIVITIES

According to the latest issue of *Offerings and Enrollments in High School Subjects, 1948-49*,¹ courses entitled "Photography" were offered for the full year in nonvocational classes to 4,044 pupils in 23 States and the District of Columbia. Half-year courses were offered to 3,425 pupils in 20 States.

Vocational photography courses in public secondary day schools were attended by 1,177 pupils in 11 States. These figures do not in either case include the units on photography in such courses as graphic arts, journalism, merchandising, and advertising, or in services of the audio-visual departments. On the basis of total secondary enrollment, the enrollment in all photography courses represents about one-tenth of 1 percent.

An interesting variation of the usual photographic course for pupils is the operation of the audio-visual services in the high school at Great Neck, N. Y., for both teachers and pupils. This program is based on the recognition of the value of photography as an integrated educational function and of the necessity for having cameras and equipment, dark-room materials, and technical assistance—if teachers are to make satisfactory use of this medium. The audio-visual department buys the equipment and materials. Several schools have well equipped darkrooms for regular school activities and as a part of the summer recreational program. In addition to the audio-visual staff who render technical help, a number of competent persons in other departments assist in the instruction of teachers.

The audio-visual department provides instruction, guidance, and supervision of facilities. The program serves the weekly school paper, the annual yearbook, and various teacher projects, supplying trained pupil photographers and darkroom technicians.

TYPES OF EXTRACURRICULAR ACTIVITIES IN PHOTOGRAPHY

The enthusiasm that is so much a part of pupils of secondary school age can be captured and channeled into three types of programs as well as into regular photography courses or units. These activities, which will help satisfy pupils' photographic interests, are the following:

1. Photography or camera club
2. Photography service club
3. Photography awards and exhibits

¹ *Biennial Survey of Education in the United States, 1948-49*. Chap. 5. Washington: U. S. Government Printing Office, 1951 (Federal Security Agency, Office of Education).

1. *The Photography or Camera Club*

As a means of expression, photography has a universal appeal. Almost everyone has experienced the desire to express an idea or to record a memorable occasion for the future by taking a photograph. Photography has well been called the universal language. In a club, a pupil may learn the principles of communication by means of photography—how to compose a picture which transmits an idea to others. Again, a pupil may be interested in the techniques, formulas and skills connected with photo processing. Still others may be interested in using photography as documentation, or as an art form.

"At the end of 1950-51 school year, there were about 6,500 camera clubs in our high schools. Their number has been steadily increasing."⁴ It is because the club is set up essentially as an opportunity for individual instruction and experimentation that it has value to the school program.

Purposes.—The instructor of photography in the Tucson, Ariz., High School, with over 12 years' experience, believes the camera club is still the best method of introducing photography to a school program. This club demonstration of interest, he feels, should be followed by a photography course in the graphic arts area. He gives the following objectives:

1. To develop photography as a worthwhile leisure time activity.
2. To improve the ability of the amateur photographer.
3. To explore the possibilities of photography as a group activity.
4. To integrate information drawn from other related fields.
5. To teach students how to look at pictures.
6. To encourage desirable work habits.
7. To develop in each pupil the ability to select, care for, and use properly the tools of photography.

Publications listed in the photographic bibliography at the end of this bulletin discuss other objectives for photography clubs.

How Clubs May be Organized.—Most school photo clubs are similar in organization and in basic facilities. They vary widely, however, in amount and cost of equipment and extra facilities available. Programs also vary widely.

The sponsor as usual is the key to a successful club. Not only should he be a good photo technician but in addition his usefulness is increased if he is competent in graphic arts, fine arts, journalism, or audio-visual education. He will no doubt be aware of the importance of group planning and the need for the club to be service minded and at the same time to guard members from the dangers of exploitation.

⁴ *Managing the High School Camera Club*. Rochester 4, N. Y.: The Camera Club and School Service Department, Eastman Kodak Co.

One sponsor writes that he has so many applicants for his photo club this year that he has had to schedule a separate club for each grade. Next year the school will offer a photography course.

Sponsors need to identify as early as possible the students who have special science skills and to help arrange instruction or provide incentives that will challenge and match their interest. In 1954-55, the Wisconsin Junior Academy of Science reported that they sponsored 55 photography clubs in that State. Most photography clubs, however, have members who are not interested in the science aspects of photography. Rather, they may be interested in the pictorial, journalistic, graphic, or fine arts aspects. Again, they may look to the club as a means of self expression or purely as a hobby. These are all valid goals and should be recognized. Interviews conducted with sponsors and others for the purposes of this bulletin gave the impression that more clubs are associated with graphic arts, fine arts, and journalism than with science departments. This may well be true because science in photography is a highly specialized field, whereas the other departments represent broader interests and a wider segment of the school population. An ideal arrangement is to have the club activity sponsored by the instructor of a regularly scheduled photography course.

Officers, bylaws, meetings, and dues are apparently fairly standard. Details of how to plan and organize a photography club, and many helpful suggestions regarding programs, can be found in the books, booklets, and periodicals listed in the bibliography at the end of this bulletin. The three booklets in that bibliography most directly concerned with setting up and conducting a club of this kind are *How to Organize a High School Camera Club*, *Managing the High School Camera Club*, and *Photography in the School*.

The facilities seen and reported for this bulletin varied greatly. One junior high school club had a 5- by 7-foot closet nicely fitted up for a darkroom. It had a sink and running water, one enlarger, and counter space for developing film, contact printing, and enlarging. A large shop-room outside served for class and individual projects. Another club in a new high school had the use of the photography course darkroom, which was air conditioned, had stainless steel workspace, multiple sinks, a variety of enlargers, etc. This lavishly equipped club was producing good work, but a club in a small junior high school having but one enlarger had produced several winning entries in a national contest. Details of the necessary club facilities are contained in books, booklets, and periodicals listed in the bibliography at the end of this bulletin. The classroom, shop, or laboratory available will naturally determine the size of the club. In addition to darkroom space, such space is needed for meetings, talks, demonstrations, etc. The industrial arts, graphic arts



Courtesy, Tucson (Ariz.) Senior High School

Darkroom facilities for making enlargements.

section, or a science laboratory are common locations for this activity. One point emphasized repeatedly by clubs was the need for a "lighttight maze" entrance to the darkroom instead of a door. Fan ventilation was also mentioned as important.

Programs are stimulated by the sponsor and the group in planning sessions. Some groups elect committees for each specialized need, others appoint an extra vice president to take charge of such activities as research, news and programs, community services, facilities and public relations.

Instruction-demonstration or personal tutoring is the basis of learning about photo techniques and use of the camera. Each pupil must of necessity progress at his own learning rate. For this reason many sponsors use individual assignment sheets containing a single problem, reference instruction material, and a task or experiment. This type of assignment sheet is especially useful for the pupil who is advanced beyond the rest of the group and who often helps the sponsor by explaining assignments to slower members.

An outside speaker, such as a sports or news photographer, or a local amateur photographer who has won prizes, will often explain various techniques. Such a speaker is always well received by clubs.

Trips are to be reserved for very special occasions—as a reward for excellent work and conduct. Field trips depend on available interesting facilities. Among places worth visiting are a newspaper plant, a commercial printer who does his own photo processing, an offset printing shop, and photo engraving and multilith facilities. A television studio is of interest in order to learn their use of backgrounds and TV camera angles. Of course no plan would be complete without a visit to the best professional photographic studio available.

As part of its program, the club at an appropriate time may arrange to notify all teachers that the club is able to make 2- by 2-inch slides in black and white or color as visual aids for classrooms. If the school has a visual aids department, then the approach to render this service would of course be made through that department.

Scheduling individual assignments becomes important in terms of available equipment. The sponsor may well ask: "Should I limit my club to 12?" or "Can I handle 16 or maybe 24 members?" Following group demonstration, all members need to be assigned work to keep them busy. If 4 sets of equipment are available (such as 4 cameras of various types, 4 film developing tanks, 4 printers and accessories, and 4 enlargers), then 16 members may be scheduled—4 to each type of activity, with rotating assignments. Some sponsors successfully use two members on each piece of equipment. Available "elbow room" and the sponsor's ability to supervise a given number of members may determine how many can belong to the club.

The photographic process has an inflexible sequence and time requirement. One meeting of 35-45 minutes once a week or every other week is not sufficient time to carry out a successful program. If a person has film being developed in a tank when the bell rings, he cannot go away and leave it. By the very nature of the activity, photo club sessions, according to many authorities, should last from an hour to an hour and a half. Some schools accomplish this by using a double period, while others place the activity in the last period of the day and let it carry over on extra-curricular time.

Members of a successful club are enthusiastic about it and feel that being a member is an honor. It is not desirable, however, to try to admit into the club every pupil who applies. Some selection should be made so as to obtain members who have the desire and capacity for improvement. In so doing, care should be exercised to avoid snobbery.

The *basic equipment*, such as that for developing, printing, and enlarging, is usually purchased from funds available to the principal. The same funds in most schools are also used to purchase from 1 to 3 specialized cameras. First in importance is a press type camera for taking school athletic and action photos in black and white. These photos are valuable for school publications and for public relations stories in local newspapers.

Probably next in importance is a good 35-mm. camera to take color photos. The transparencies are excellent to use in a slide projector for classroom instruction. Suitable slide subjects can make up a good program for PTA or other community groups. Also important for these programs are 8-mm. movies.



Courtesy, Carrick High School, Pittsburgh, Pa.

Club using graflex camera to take a picture through a window.

A third type may be a larger or a smaller press camera or a reflex camera. Many schools also have in stock 10 or 12 inexpensive box and bellows type cameras for teaching beginners.

Accessories such as exposure meters, tripods, photo flood lights, etc., are part of the photo club laboratory equipment. Most schools furnish contact and enlarging paper and necessary chemicals for school assigned projects. Some schools charge pupils for wasted supplies and for paper used for personal projects.

Other club projects suggested in letters and interviews with sponsors are described on the next two pages.

Yearbooks are sometimes a good project and other times a real problem. One important question is how much repetitive work can members do and still obtain educational benefits. Unquestionably, the camera club should provide group photos of school activities. In some smaller schools the club also takes the small photos of each pupil for the yearbook. If there is a local commercial photographer, however, he may feel that such action on the part of the school is unfair competition. Where this has been an issue, it has been found to be more prudent to let the school



Courtesy, David Starr Jordan High School, Long Beach, Calif.

Photography for the school yearbook.

camera club provide group photos of school activities and let the commercial photographer provide the small individual photos. This of course becomes a necessity in large schools, since the sponsor cannot impose this huge task on a small club, using as justification "experience is good training."

A club bulletin board is also valuable and some one person or a committee should be designated to see that new articles of interest are posted.

A reference library of books available for either assigned reading or for research is a necessity. Some of the books found most useful by the schools that supplied information for this bulletin are listed in the bibliography.

Money raising events are often an important part of the growth and development of a photography club. The means of raising funds are varied and a group discussion will bring to light many good ideas.

Among the more successful ideas widely used is selling 8- by 10-inch enlargements of exciting action shots of basketball or football games, of the school band with its majoréttés, or of the school chorus.

"Trader" or pocket-size pictures of student body officers are much sought after in some schools. If a local civic event (such as the Portland Rose Festival, a ski tournament, a grand ball, or flower show) awards honors, club members print and sell hundreds of billfold-size photos of the winners. One school reports that over half the pupils buy copies. It is well to have all orders prepaid.

Christmas cards are another popular photographic project. School pictures on postcards sell readily the year round with profit to the club. One school reported raising more than \$500 during only a few years. The club used the money for additional equipment and for large mounted prints of selected photos by the world's leading photographers, such as Ansel Adams, Edward Weston, Yousuf Karsh, and others. These provided inspiration for the members in club and classroom.

Fund raising methods run the gamut from these photo projects to cake and candy sales at public functions and even to popcorn and soft drinks sales at ball games.

2. The Photography Service Club

This club, usually an extension of a school photography course, is attached to it in a manner illustrated by the one at Tucson Senior High School, Arizona, known as the Badger Camera Clickers Club. The purpose of this club is service and sociability. It serves the school publications and other activities of the school, for example making 2- by 2-inch slides for visual aids. When a pupil has been selected to work on a school publication as a photographer, the members vote him or her into the BCC service club. Membership in this club satisfies the need for attaining greater achievement and offers the opportunity for receiving individual instruction and for doing advanced work.

The Tucson club does all the photo work for the several school publications except the small portraits of the pupils for the yearbook. A commercial photographer takes these photos since the high school has over 5,700 pupils.

The sponsor also arranges social occasions for the BCC group so that they can feel they are a part of the social life of the school. Whenever a visitor wishes to see the facilities of the photography department, a member of the group, rather than a member of the faculty, acts as escort.

The group also plans field trips and projects. This service club gives an incentive to all pupils taking the photocourses to cooperate and work hard in order to become a member of the Tucson High School BCC Club, as it is a high honor to be voted into its membership.

A photography service club composed of advanced pupils can be a vital and modernizing force in the total program of the school.

3. *Photography Awards and Exhibits*

Praise and awards are powerful incentives. They stimulate the individual to maximum effort in his own behalf—therefore are valuable as a basis for school activities. Most local exhibitions of the work of photography clubs are an event set apart from their club or other activities. It is an honor to have a photograph exhibited and the winning of a prize is a thrill and an added high honor.

A local contest and exhibition can be based on the same general rules as those followed by the national contests to be discussed later. The most basic attribute of any contest or exhibit is to have the club member in a position to say, "This is mine. I did this work myself."

Judges may be obtained from different segments of the community but they should have an appreciation of what constitutes a good picture and an understanding of its technical qualities. Judges need to understand that they will have to grade the entries and explain why certain photographs are better than others before they assign the prize winners their relative rank.

Once the judging is completed, the mounted enlargements should be made the subject of an assembly program at which the principal, sponsor,



Courtesy, Curtin Junior High School, Williamsport, Pa.

Portion of a traveling salon display.

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art teacher, and chairman of the judges speak briefly before the awards are announced. Usually the exhibitions are then arranged in corridor display cabinets or on panels. If such space is not available, the exhibit may be displayed on plywood panels or easels on the stage of the auditorium. The art teacher may be one of the judges and often finds the exhibition a source of instruction concerning print quality and the interpretation of ideas.

Two high school competitions of national scope may be used to motivate pupil interest in photography. Competitions are conducted annually, with prizes and prestige as awards and both are approved by the contest committee of the National Association of Secondary-School Principals.

The National High School Photographic Awards is a contest sponsored by the Eastman Kodak Co. The Scholastic-Ansco Photography Awards are sponsored by Scholastic Magazines and the Ansco Co.

The winning prints in each contest are made up into a traveling salon exhibit available to schools on request. A survey of schools viewing one of the salon displays shows that the exhibits are valued highly. Over 97 percent of the teachers replying reported them interesting and useful.

Of the schools viewing the exhibits 59.6 percent had a camera club. Most schools reported that their camera club meets once a week. Next in frequency is twice a month.

The survey mentioned above also gives the percentage of activity in different grades and the percentage of entries in color and black and white. Of the total entries 25.2 percent were color photographs from grades 7-12; 15.6 percent were black and white from grades 7-9; and 59.1 percent were black and white from grades 10-12.⁶

The judges and sponsors of these competitions feel that the stimulation to good craftsmanship brought about by national awards is important and certainly worthwhile. As a motivation to achievement, these awards and contests are a valuable type of activity. Even without a photo club, schools find the exhibitions of winning photos interesting. Art, English, social studies, and most other classes benefit by analyzing the communication of ideas in the photos.

COOPERATING AGENCIES

Among many local organizations that may help schools in various ways regarding photographic matters are art museums, public libraries, civic organizations, department stores, industrial concerns that use photo processes, newspapers, and photo supply retail stores.

⁶ These data were furnished through the courtesy of Scholastic-Ansco Photography Awards.

Many of the organizations are found also on State and regional levels. In addition, most States have a person in charge of audio-visual education in State departments of education who is listed in a directory.⁷

Nationally, the manufacturers of photo equipment and supplies often are glad to help any educational activity in the photographic field. The Eastman Kodak Co. maintains a Camera Club and School Service which offers help, advice, publications, program and teaching assistance to photographic groups, both hobby and instructional, and visual aids.

Scholastic Magazines, 33 West 42d Street, New York 36, N. Y., has a camera editor who offers advice and publications of interest to school photo clubs.

Several photography magazines print articles about school camera clubs in addition to the usable technical articles on cameras, materials, and techniques.

⁷ 1955-56 *Directory of Individuals in Charge of Audio-Visual Education in State Departments of Education*. U. S. Department of Health, Education and Welfare, Office of Education, Washington 25, D. C. 4 p. Mimeo. Free. *A Directory of 2660 16 mm Film Libraries* (Office of Education Bulletin 1953, No. 7) is available from the U. S. Government Printing Office, Washington 25, D. C. 50 cents.

Chapter IV. Radio as an Extraclass Activity

THE RAPID INCREASE in the production and use of radio, television, and electronic control equipment is one of the most amazing developments of our day. Expansion in the use of radio came first and it represents one of the very large industries of the country today. As the use of radio almost overshadowed the use of the piano and the phonograph in the 1920's, so today TV threatens to overshadow the popularity of radio. The television industry alone has increased its production of TV sets from "7,500 in 1946 to 6,500,000 sets in 1950."¹ According to *America's Needs and Resources*, "the development of electronics during the past decade is ushering in a new and revolutionary era of 'automation.'"² Many industries are now in the process of converting to electronic controls to modernize their production.

Because of this enormous expansion in the entire field of electronics, it is important to recognize that this field should be emphasized in whatever ways possible in school programs, whether by courses or by extraclass activities. Our economy will require engineers, technicians, machine operators, assemblers, and also communications specialists in the field of radio. The benefits of radio and amateur radio communications as a worthwhile hobby should also be recognized. The United States has more licensed amateur radio operators than all the rest of the world put together.

RELATIONSHIP OF SUBJECT COURSES TO CLUB ACTIVITIES

The most recent survey³ shows the following public secondary school enrollments in the school year 1948-49 under the course title "Radio." There were only 702 enrolled in half-year and 9,236 in full-year vocational radio courses in 40 States, while in nonvocational courses the half-year enrollment was 698 and full-year course enrollment 2,550 in 25 States.

The total of all these enrollments is 13,186, which is a little over one-tenth of 1 percent of the total secondary day school enrollment. The curricular offerings carry such titles as Radio and Electronics, and Radio Physics in the science departments; Radio Code and Practice in industrial arts departments; and Radio and Electricity in vocational courses.

¹ Dewhurst, Frederic J., and Associates. *America's Needs and Resources*. New York: The Twentieth Century Fund, 1955. p. 137.

² *Ibid.* p. 868.

³ *Offerings and Enrollments in High School Subjects, 1948-49* (Biennial Survey of Education, 1948-50, Chap. 5) Washington: U. S. Government Printing Office, 1951 (Federal Security Agency, Office of Education).

It should be emphasized again in this chapter that schools need to include in their programs either courses, units, or extraclass activities in this important field of radio in order to meet modern technological demands and to interpret an important segment of modern life to their pupils.

TYPES OF EXTRACLASS ACTIVITIES IN RADIO AND ELECTRONICS

There are several types of radio and electronics clubs that result in varying kinds of activities, such as:

1. The Amateur Radio Club
2. The Radio and Electronics Club
3. The Hi-Fi Club

Although these clubs may seem quite similar, in actual practice they are quite dissimilar. Pupil reaction to them also varies. Some pupils are interested in 1 club only and may even have a dislike for the remaining 2. Other pupils having a greater breadth of interest may participate in 2 or in all 3 in different years. One type of pupil is usually the specialist who aims for further education in the same field. A second type is usually interested in the hobby phases of the activity. Either goal is a worthy educational aim.

1. The Amateur Radio Club

Most of the members of amateur radio clubs study radio theory as well as radio code and develop proficiency that enables them to pass the Federal Communications Commission examination. They acquire the status of a Government licensed amateur radio operator and obtain a station license and call letters. In spite of the formidable qualifications and rigorous tests, they call each other "hams" within the fraternity. This term carries no stigma—in fact it is complimentary. The services rendered by this group of "hams" during periods of emergency are well known, as stories of their phenomenal rescue and other services have appeared in newspapers¹ and magazines.²

"Amateur radio has fascinated technically inclined youth since 1903 when Marconi, who considered himself an amateur, succeeded in spanning the Atlantic Ocean by wireless. * * * Today there are approximately 100,000 amateur radio operators in the United States. * * * They have combined to form the American Radio Relay League."³ In the secondary schools of the country there are known to be over 150 licensed school amateur radio stations. Very likely the total is much greater.

¹ For example in *Adelphi Star* (Burlington, Calif.) for Jan. 16, 1956.

² For example in *The Instructor* for Sept. 1953 (article entitled "Amateur Radio in Public Schools").

³ Dewhurst. Op. cit. p. 359.

The FCC Amateur Radio License is a mark of distinction. It enables an amateur to communicate with other amateurs across the country and in all parts of the world, under specific transmitter frequency restrictions, regulations regarding the type of emitted signal, and regulations on operating procedures. These amateurs or hams are avid hobbyists, but often their hobby leads first to further specialized training and later to positions in various industries.⁷

Purposes.—The purposes of one school radio club are "to teach new members the code; to become actively engaged in civil defense; and to win WAS and DXCC certificates." The WAS certificate is awarded upon proof of communicating with all States, and the DXCC certificate upon proof of communicating with 100 countries. Both are given to members by the American Radio Relay League, West Hartford 7, Conn.

Another school states its objective in educational terms: "to promote a constructive educational lifetime hobby through amateur radio."

Still another includes such objectives as "to promote communications with other schools; to provide a source of trained radio operators who may be available during emergencies; to provide radio as a teaching aid in physics and science classes."

How Clubs Are Organized.—The demand for a club should, of course, come from pupils to a faculty member. If the school is fortunate enough to have an instructor who is also a licensed amateur radio operator, this person should become the sponsor.

The *sponsor* is responsible to the principal for the program and for developing the organizational plan of the club.

The *officers* are those normal to any similar club activity.

The *constitution and bylaws* should be well thought out. The experience of others is reflected in sample constitution, bylaws, hints on organizing a club, and other materials of interest available from the American Radio Relay League, West Hartford 7, Conn., on request.

A *trustee* must be a licensed amateur radio operator above the novice grade. If the sponsor is a licensed operator of this type, he may fill both positions. If not, then a trustee must be elected from qualified and acceptable persons in the community. The trustee is required to be responsible to the Federal Communications Commission for the legal phases of the operation of the station. For instance, he must see that the quality of the transmitted signal meets legal requirements and that the station is operated in accordance with regulations, etc.

Amateur radio licenses are required since radio interference is a serious matter. Congress has granted the FCC authority to interpret the laws

⁷ The careers of certain former amateurs in the Shorewood High School Radio Club (Shorewood, Wis.) are a case in point as related in the club's bulletin (mimeo), *PHWZ*, for June 1950, p. 14-15.

and regulate all aspects of amateur radio communications. Any transmitter that radiates a radio signal must have a FCC station license. A licensed operator must be in charge of the equipment whenever it is "on the air." Four classes of amateur operator's licenses are sought by club members: Novice, technician, general, and amateur extra class.



Courtesy, Parma (Ohio) Senior High School

Club members operating amateur radio station at their school.

Each has different requirements for qualification. A complete discussion of license topics is contained in publications such as *The Radio Amateur's License Manual*.²

Facilities for the amateur radio club may be located in the industrial arts, science, or electric department or they may be separate from any department. One club used part of a school storage attic very successfully.

Dues are assessed according to projects planned, ranging from 10 cents a week to 75 cents a month. Supplementary items of equipment are often bought with funds raised by dues or social events.

Programs vary according to the needs of club members. The school administrator should not confuse amateur radio communications with the school educational broadcasting program. They are two separate types of activity with different FCC laws and regulations governing each. Amateur radio is based on point-to-point communication between licensed operators, whereas educational broadcasting is disseminated to various communities rather than individuals. School amateur radio programs almost invariably include code instruction classes and enough radio theory to enable club members to pass one of the FCC examinations and obtain one of the coveted licenses. Code practice equipment is usually built by the class. Of special interest to beginners are the following: *How to Become A Radio Amateur*, *Learning the Radio Telegraph Code*, and *A Course in Radio Fundamentals*, all published by ARRL.³ This organization is a noncommercial association operated by radio amateurs for their mutual advantage. Other reference books and manuals are listed in the bibliography.

Projects include building additional school equipment or equipment needed for a home station; building and maintaining radios for a local hospital or similar institution; communicating with other amateurs to develop communications skills; participating in various local, national, or international contests; taking trips to local electronic companies; getting speakers from the radio and electronic industry; cooperating with teachers in other classes to relate the things learned in communications work to other subject fields.

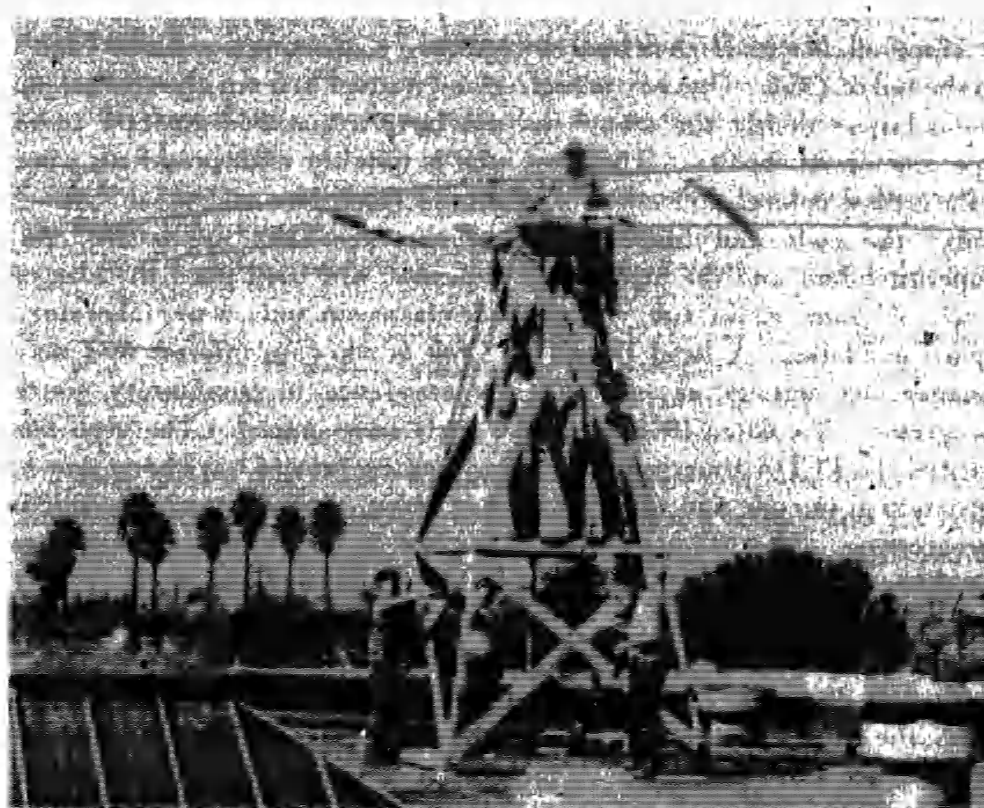
Events especially popular with clubs are the annual field day trip complete with various events and box lunches or open-air cooked meals; and the three contests—the VHF (very high frequency), the DX (distance) and the SS (sweepstakes).

Most clubs meet once a week. An additional schedule of operating periods is sometimes arranged to utilize members' study periods, noon hours, and some after school hours.

² Published by American Radio Relay League, West Hartford 7, Conn.

³ American Radio Relay League, West Hartford 7, Conn.

The equipment is usually purchased with school funds. The basic item usually purchased first is a good commercially built "all band" receiver. Reports for the present bulletin showed that transmitters vary greatly—from the 1-band, 10-watt, home-built transmitter to the "all band" commercially built higher powered transmitter. All these transmitters are capable of communicating by phone on appropriate bands, or by "C.W.," which term characterizes transmissions using Morse code and a telegraph key. One or more outside antennas are needed, which usually include a multielement rotary beam on top of a tower. Modern manu-



Courtesy, Pomona (Calif.) High School

The school-built 20-meter rotating beam will direct signals to other countries.

facturing methods have so refined this equipment that it is of clean design and is attractive and inexpensive.

Examples of School Amateur Radio Club Activities.—There are so many good school club activities that only a few examples can be described here. They were chosen to illustrate different types of organization or activity.

Shorewood, Wisconsin, High School is typical of schools with a long history of well planned amateur radio clubs. In 1955, their club (call letters W 9 HWZ) had 20 members, 11 of whom had passed their FCC

exam and obtained their own licenses. This station has operated under the same license since 1933. Having very good equipment, it can operate on practically all amateur bands. The station has communicated with all continents and is very proud of its display of "QSL" cards confirming their many worldwide contacts. The club is enthusiastically endorsed by the superintendent of schools and the high school principal, who has had mimeographed a 15-page history of the club, giving suggestions on how to start a club, and on program features, and values of the club to pupil, school, and community. It contains a good constitution and set of bylaws. The stories of many former members who have made good in radio communications, the electronics industry, and the military services are interestingly told.

Marshall, Mich., High School started the "12/27 Amateur Radio Club" in the fall of 1954. One boy in high school wanted to learn about amateur radio but evidently the school did not have a qualified amateur radio operator on its faculty. This boy, who is now the club president, went to a retired colonel and asked if he would teach him and other "school kids" the code and fundamentals of theory. They approached the superintendent and the high school principal, who both liked the idea of a school "ham" radio club. They made classroom and science laboratory space available. A local Exchange Club is showing interest and may finance the activity as part of their assistance to community youth programs. To date, 19 boys and 3 girls have joined. The club has visited the FCDA Emergency Warning Center, movies have been shown, instruction in code and theory has been given, and construction work is progressing. The colonel writes, "Needless to say, this movement has fired the imagination of all those who have attended and we have rosy hopes for the future."

Wisconsin has a unique county Educational Amateur Radio Net¹⁰ with over 30 school stations within the county as members. To begin with, the office of the county superintendent purchased a 50-watt amateur transmitter and receiver for mobile use in classroom demonstrations for the county schools. A supervising teacher in the county who is a licensed radio amateur now has charge of the use of the station. The county superintendent's staff feels that amateur radio can make a contribution to many classroom activities. The aims are to enrich, through communications skills, the subject fields of science, history, citizenship, geography, English, speech, etc. The method is by occasional demonstration use of radio communications with other appropriate amateur stations when a class is studying community, State, Nation, or world situations.

¹⁰ For an account of this radio net, see article, "Amateur Radio in Public Schools" by Dorothy Housie Guilkey in *The Instructor*, Sept. 1953.

As an incentive or as a climax to a period of hard study, a Spanish class may be scheduled to communicate with an amateur in a Spanish-speaking country. This technique is of value also to teachers in other schools with whom members of various classes communicate.

The following are direct quotes from a number of amateur school radio clubs relating various facts about their clubs:

Our main objectives are to teach new members the code, become actively engaged in self defense, and to win WAS and DXCC certificates. * * * We hope that we can set up regular schedules with other schools.

The school station is on the air all day long.

The noon hour is used for QSO's.

We desire schedules with other schools.

When our club station is completed, we hope to have 500 watts on both CW and phone.

We are working at the job of building a ham rig for school use.

So far we operate with 10 watts; we are building a 150-watt school rig.

We divide our meeting time with 30 minutes each devoted to code practice, theory, and on the air.

Ham shack is open to visitors of the school at all times * * * to watch hams on the air.

Our amateur radio club is in a graded school. In less than 1 year, 19 have received novice licenses; 1 general class; 7 are waiting for novice class; 4 are waiting for general class; 7 are waiting for technician licenses; 25 are studying for novice; 15 studying for general, and 10 studying for technician.

Public Service and Public Relations.—A well organized amateur radio club is a good public relations medium between a school and its community. Newspapers are glad to carry stories of the outstanding accomplishments of clubs and individual members. At an "Open House" parents and community officials are fascinated by the ability and accomplishments of club members who will take messages for relay to any address in the world. School club members at times have also contributed, as previously mentioned, to flood and disaster relief by their part in emergency communications nets.

2. The Radio and Electronics Club

This club is concerned with the construction, experimentation, repair, and maintenance of radio and electronic equipment. It is a field of activity that leads individuals to further training and employment as technicians. The increasing demand for trained personnel in this field has been one of the phenomena of current industrial development.

How Clubs Are Organized.—The demand for this activity usually comes from pupils who may have projects that they want to accomplish in radio or electronics equipment construction. Again, the demand may come from a principal who needs a good amplifier and speaker to add to

the auditorium facilities. A questionnaire sent to all classes usually will bring the names of qualified pupils with an interest and some skills in radio. Such a group can form a club and start with a service project for their school.

The *sponsor* is usually the instructor of a course in electricity or any staff member, such as a science teacher, who enjoys this field as a hobby. He should be well versed in uses of tubes, a variety of equipment, and circuitry. The club usually meets in the shop or laboratory of the ~~SPONSOR~~.

The *meetings* of most clubs are held one period a week. However, during the construction of projects, selected pupils are approved to do voluntary work during lunch or free periods, or after school. The officers are those needed to carry out the club program.

Dues are generally small, 10 cents a meeting being common where the school pays for equipment and materials used on school projects. Personal projects are usually paid for by the pupil. The only cases of higher dues noted in the reports for this bulletin occurred when the club wanted additional test or other equipment. In most of these cases, money raising projects were held to supplement dues.

The *program* is ordinarily determined by the group, with the aid of the sponsor in identifying their individual abilities and needs. Because of their enthusiasm, it may be difficult to distinguish the boy with ability from the boy who has learned his radio vocabulary without knowing the fundamentals. A construction project will usually identify the boys with real understandings and skills. The program should develop each boy according to his need. Most programs are built around construction, repair, maintenance, and experimental projects.

Many variations are possible. For instance, in Pomona, Calif., a high school radio club made and presented two table radios to their local hospital. With this fine community service went the assurance that the school club would keep the radios in working order. Many schools feature club displays and demonstrations during school "open house." Visits to electronics manufacturer's facilities, radio, and TV studios are valuable.

A number of electronics clubs have constructed public address systems, either as fixed installations for school athletic events or as mobile installations in a truck for public address work.

Other schools construct dramatic club aids, such as stage lights, light dimmers, cue lights, microphone amplifiers, and speaker combinations which are usually matched into record players or tape recorders.

Similar aids for speech classes are possible, providing the instructor opportunities to record and play back pupil speeches for analysis and correction.



Checking Haystack, U.M.W. High School

Pupil testing school-built amplifier to get maximum operating efficiency.

Equipment normally found in any electrical shop would be satisfactory for a radio and electronics club. If the club is conducted in the science department, then the additional benefits from being able to use the science multimeters and other test equipment would be an advantage. Clubs usually have to start with minimum essentials, then add to their equipment as experience indicates a need.

3. *The Hi-Fi Club*

Pupils interested in Hi-Fi are usually a highly motivated group. Their interest stems from an appreciation of good music. They are interested in the quality of the stamping of the record as well as in the amplifier and speaker design. They are partial to "FM" rather than "AM" radio tuners. They know the good quality amplifiers by name and model number, and will discuss with earnest conviction the "frequency response" of various speaker systems.

How to Start a Hi-Fi Club.—Usually the conventional questionnaire sent to all classrooms, asking each pupil to make first, second, and third choices from an activities list or to write in his major interest, will reveal many pupils with Hi-Fi as their first choice.

A sponsor should of course be qualified from either the technical or the music appreciation point of view. In this club it is essential that the sponsor should contribute to the discussions and be a sympathetic hobbyist. Preferably, he should be a good technician capable of supervising the construction and testing of Hi-Fi amplifiers.

The meeting is scheduled one period a week, but in order to develop projects, it is often necessary to extend the activity into after school hours. There is no problem in getting club members to stay. The problem lies in getting them to leave—they become so absorbed in their work. The elected officers normal to most clubs are adequate.

Dues are often \$1 a month or more. This treasury is used to purchase records, special equipment, and tools or even a complete a Hi-Fi system for the cafeteria or other student uses.

A program speaker who brings demonstration equipment, such as amplifiers, speakers, and demonstration records, is very popular. Club members learn the values of multispeakers versus single speakers, the variations in crossover networks, the characteristics and limitations of a variety of equipment, and the performance characteristics of microphones, recorders, amplifiers, and speakers. Visits to local electronic manufacturers will prove of value, and visits to radio and TV studios will contribute much to the club's programs.

Equipment normal to any electric shop is satisfactory for the use of this club. If the club is not conducted in this shop, then the sponsor should provide equivalent tools if construction work is to be a part of the program. Again, it appears that usually school funds are used to provide the basic tools and test equipment, or else the school provides parts and kits for club members to build necessary test equipment.

COOPERATING AGENCIES

Often local civic or service clubs are interested in giving financial support to school club activities having a technical nature. If the community has a manufacturer of electronics equipment, he may be willing to donate, for educational use, parts and equipment rejected during factory inspection. This provides a source of usable parts such as resistors, condensers, switches, potentiometers, dials, etc. Industrial support of this type is valuable to all club activities discussed here.

Speakers are available from local, State, or national organizations. They may represent industry, labor, national membership organizations, or engineering and professional groups.

In the field of amateur radio, the American Radio Relay League, West Hartford 7, Conn., is the only national membership organization. Members receive the official monthly magazine, *QST*, which is devoted entirely to amateur radio and contains many articles of interest to beginners. Other magazines and bulletins are listed in the bibliography.

Chapter V. Summary of Extraclass Values to Pupils, School, and Community

BENEFICIAL RESULTS are most apparent in pupils but are also apparent in the school and community when extraclass activities are well planned and administered. Enthusiasm is particularly the keynote in aviation, photography, and radio club activities since these areas are currently interesting and important to youth.

Informal learning proceeds at a rapid rate because of pupil interest and enthusiasm. Club members read widely from current magazines in their chosen fields as well as from reference books. Developments in these three fields of science are so rapid that wide reading is important and marks the club members as unusually well informed.

EXAMPLES OF BENEFITS

Pupil values can be clearly observed in many ways. One is by a visit to an "open house" where pupils are demonstrating their club activities.

Among the benefits to pupils growing out of these and other extraclass activities are improvements in citizenship, leadership and personal development.

A few situations will illustrate and highlight some specific pupil values:

Good sportsmanship is exemplified in model airplane contests. It is not unusual for one pupil to help another with difficult tasks—sharing special techniques, so that one boy may be helping another to win a valuable prize.

Good citizenship is developed by radio amateurs in contacts with other amateurs in all parts of the Nation and in other countries. He relays messages without cost between servicemen and their families. He may take part in civil defense drills or in flood and tornado relief work.

Service to others is demonstrated by a photography club or a photo service club when members produce photographs for the school paper or magazine.

Pupils develop leadership through having the opportunity to serve as club officers and to serve on committees, as well as to participate in the group program planning common to club activities.

An impressive number of cases could be related illustrative of pupils who develop valuable and lasting interests by means of an extraclass activity. These interests often prove to be important, leading to further education or training in the same or related fields and finally resulting in outstanding careers. The following are typical examples:

One of the renowned figures in the field of commercial photography in New York City had planned to be a lawyer until he entered the photography club of his high school. In this club, he developed a lasting interest in the subject.

A woman engineer at Boeing Aircraft Co. who is now an aerodynamicist obtained a first and lasting interest in aviation as a school girl through a model airplane club.

The president of one of the largest manufacturers of radio, television, and electronic equipment obtained his first and lasting interest in radio in his high school "wireless club," sponsored by the physics teacher. He received his amateur license in 1916.

The Federal Communication Commission, Washington, D. C., has a bureau chief responsible for public safety and amateur activities who obtained an early interest in radio in his high school amateur radio club, sponsored by the physics teacher, who inculcated in the boys the belief that they could achieve great things.

In the FCC, an assistant bureau chief of field engineering and monitoring was a member of a club sponsored by the algebra teacher, who developed qualities of leadership in the club members. These Government officials pay high tribute to the sponsors and to the value of their club activities.

In addition to pupil benefits, there are certain values to the school that cut across the curriculum, administration, and public relations fields. Perhaps the most valuable feature of the three extraclass activities discussed in the present bulletin is the enormous amount of interest and enthusiasm generated by club members. This is a priceless asset to any school. Many authorities point out that there is no difficulty in getting pupils to stay after school hours to continue their club activities. Rather, it is sometimes difficult to get them to leave.

Among the benefits derived by schools are enrichment of curriculum, motivation of pupil, and good school-community relations.

Continued scientific and technological developments will make a careful selection of hobbies more important in the future. The worthy use of leisure time is increasingly a community problem. Some civic programs are designed to remedy juvenile delinquency, whereas those designed to promote the worthy use of leisure time are of a preventive nature. Since the community is made up of individuals, many pupil values also have great importance to community life.

Illustrative of benefits to the community resulting from aviation, photography, and radio clubs, and other extraclass activities are good sportsmanship, service to others, and worthy use of leisure time.

Industry is increasingly taking a long-range interest in developing students through the stimulus of scholarships. Awards or full or partial scholarships offered by local industry do much to stimulate pupils to

greater achievement. Many clubs have impressive records of former members who later succeeded in the same scientific or technological phases of industry as those represented in the club. This is a proof of the value of early identification, by means of clubs, of youths having special skills and interest in science and other fields. Many of them continue a lifelong absorbing interest in the same field, thereby making a greater contribution to community and national life.

The three types of activities with which this bulletin is concerned help talented youth by gathering together in clubs those of similar interest, stimulating their individual growth and leading more of them toward fields in which there are national shortages, such as aeronautical engineering, electrical engineering, science research, and mathematics. The good citizenship fostered by cooperative interest in these activities by both school and community makes for a stronger nation, through increased achievements of club members.

GUIDES FOR SCHOOL ADMINISTRATORS

The current importance of the three activities should appeal to any administrator who seeks to improve the relationship of the curriculum to extraclass activities. The following are guides useful to administrators. They are derived from the successful practices described in previous chapters:

1. Support of club activities from funds administered by the principal is essential. Club dues often are inadequate to purchase essential items of equipment. No club can succeed long without good basic equipment.
2. The three types of activities are successful in both junior and senior high schools.
3. Best results are definitely associated with good planning and the assistance of a competent sponsor.
4. Club activities should not be a substitute for courses in the subjects. They often are a first step and may demonstrate a pupil demand that would support an elective course.
5. Talented individuals are the backbone of any activity but many unoriented or less brilliant pupils find themselves through club interests.
6. Interests awakened by club activities often result in an improvement in academic standing.
7. Photo clubs are more lasting and successful when they are closely associated with graphic arts, fine arts, or journalism departments.
8. Two consecutive periods are desirable in the case of photo and model airplane clubs.
9. Devices such as the "open house," exhibitions, community-sponsored contests, industrial field trips, awards, or special recognition serve many times to stimulate interest and also to reward achievement.

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